FOREST PRODUCTS
Project Fact Sheet

BIOLOGICAL AUGMENTATION OF KRAFT RECYCLE

BENEFITS

- Increased production of pulp without increasing energy use or environmental emissions during the recovery of the kraft chemicals
- Diversion of 50 percent of the total sulfur to a biological fermentor, increase in the mill's recycling capacity by 12 percent, and enhancement of profits by $6 million to $12 million annually, in a mill producing 1200 tons of pulp per day
- Rapid recovery of $8-million capital investment from the increased profits in the BAKR system
- Less profit from methods requiring lower-cost capital investment because of costly chemicals

APPLICATIONS

Two years into the investigation, if the results are promising, the University of Washington's Office of Technology Transfer will seek implementation of the BAKR in a commercial setting, with the cooperation of the pulp industry. A pilot plant would be demonstrated during the third year, with minimal disturbance to an operational mill, and would provide the experience and data for full implementation of BAKR at some later date.

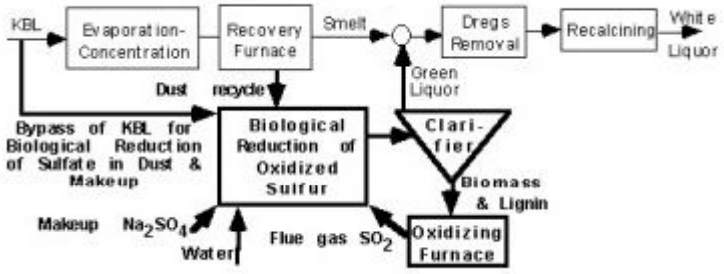
Biological Reduction of Kraft Chemicals Will Add Capacity to Under-Producing Pulp Mills

The recycling of sulfide and alkali pulping chemicals is an integral part of the kraft process for producing pulp, and one that makes it economical. Unfortunately, the recovery furnaces in many mills are of limited capacity, presenting a process bottleneck that restricts pulping capacity. Estimates are it would cost $30 million to $40 million to increase the capacity of recovery boilers by 10 to 20 percent. However, an alternative method has been suggested for recycling the kraft chemicals that would not require improvements to the furnaces.

In the "Biological augmentation of kraft recycle" (BAKR) system, bacterial systems biologically reduce the oxidized sulfur produced during pulping to sulfide. Diversion of a portion of the sulfate in the dust from the furnace stack and electrostatic precipitators, and from the makeup saltcake, to a biological fermentor, would reduce the load on a mill's recovery boiler. This would allow the remaining kraft chemicals to be recycled in the furnace by conventional means.

At present, the oxidized sulfur in the dust and makeup saltcake represents 51 percent of the total sulfur entering the furnace and is detrimental to its operation. Reducing this deadload on the furnace would not only increase its recycling capacity but also enhance its longevity, particularly in mills where production is limited by a recovery-furnace bottleneck.

Schematic of Biological Augmentation of Kraft Recycle



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PROJECT DESCRIPTION

Goal: Using kraft black liquor as the organic source, optimize sulfur reduction in bioreactors.

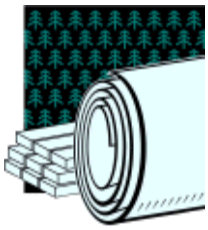
Reconstitution of sulfate to sulfide and simultaneous oxidation of low-molecular-weight organic compounds to carbon dioxide are common reactions under anaerobic biological conditions. The effects of BAKR will be tested on dregs removal and lime cycling, as well as on subsequent pulping.

PROGRESS & MILESTONES

- If BAKR provides adequate levels of sulfide at adequate loadings for use in pulp mills, the effects of BAKR on other mill chemical recycling processes and on pulping quality will be determined.
- If the BAKR system can be integrated with existing mill processes without adversely affecting pulp quality, a pilot demonstration will be planned.
- With the cooperation of the pulp industry, a pilot plant will be built and tested at a working mill during the third year of the project.
- The new technology is expected to significantly enhance the mill's efficiency and profitability.

AWARDS, PATENTS, AND INVENTION RECORDS

- Support Aerated Biofilm Reactor Patent #5,116,506, May 26, 1991



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